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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/624,487 | 07/23/2003 | Shih-Fan Wang | Q76671 | 7818 |

23373 7590 07/07/2004

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EXAMINER

CHU, JOHN S Y

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| ART UNIT | PAPER NUMBER |
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1752

DATE MAILED: 07/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/624,487

Applicant(s)

WANG ET AL.

Examiner

John S. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the application filed July 23, 2003.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

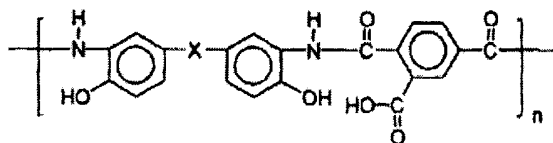
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-11, 13-28, and 30-33 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by TOMIKAWA et al '764.

The claimed invention is drawn to the following:

1. A positive photosensitive composition, comprising:
a poly(imide-benzoxazole) precursor prepared by the reaction of trimellitic anhydride halide monomer with bis(o-diaminophenol) monomer, wherein the poly(imide-benzoxazole) comprises at least a repeating unit as the structure below:



wherein the X is -O-, -S-, -C(CF₃)₂-, -C(CH₃)₂-, -CO-, -CH₂-, -NHCO-, -SO₂-, -SO-, or a bond;
and

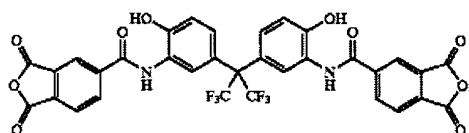
n is an integer from 10 to 100;

a photosensitizer; and

a solvent.

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TOMIKAWA et al discloses a positive photoresist composition comprising a polyimide precursor and a naphthoquinonediazide compound. The claimed poly(imide-benzoxazole) precursor is anticipated at Examples 1 and 2 found in column 26, line 45 – column 27, line 51. These examples disclose a polybenzoxazole precursor made from a diamine and an acid anhydride of Synthesis Example 5. Synthesis Example 5 as disclosed in column 18, lines 35-61 disclose the following acid anhydride structure:



which is made by reacting a trimellitic acid anhydride chloride with a diamine of 2,2 bis(3-amino-4-hydroxyphenyl) hexafluoropropane. The resulting structure is then reacted with another diamine as recited in Example 1 forming a poly(imide-benzoxazole) precursor which is then added to a naphthoquinonediazide compound. TOMIKAWA et al characterize the resulting composition as Varnish A. Varnish A as recited anticipates the claimed positive photosensitive of the current application.

Likewise Example 2 discloses a reaction between a diamine compound and the acid anhydride of Synthesis Example 5. This reaction yields a poly(imide-benzoxazole) precursor) which is then mixed with a naphthoquinonediazide compound, giving a Varnish B (column 27, lines 33-41). Varnish B as recited anticipates the claimed positive photosensitive of the current application.

Subsequently each of Example 1 and 2 are processed by coating on a silicon wafer, exposed through a photomask, developed and dried. The disclosed Examples meet the claimed method as recited in claim 18-28 and 30-33.

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Claim Rejections - 35 USC § 103

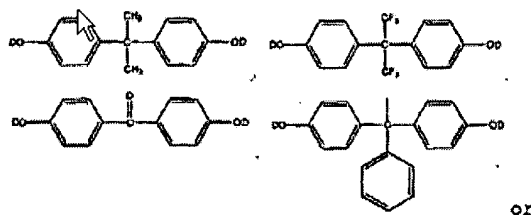
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

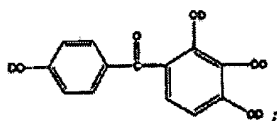
4. Claims 1-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over TOMIKAWA et al.

The claimed invention has been recited above and is included by reference. Claims 12 and 29 previous omitted in the previous rejection recited the following:

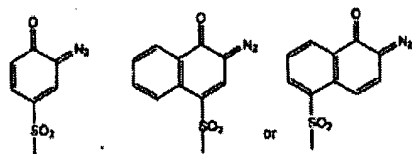
12. The positive photosensitive composition as claimed in claim 1, wherein the photosensitizer comprises diazonaphthoquinones as the structures of



or



wherein D is hydrogen,



TOMIKAWA et al has been recited above for the disclosures in Examples 1 and 2, which anticipate claims 1-11 and 13-28, and 30-33. These examples fail to explicitly recite the

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particular quinonediazide compound mixed with the claimed poly(imide-benzoxazole) precursor of claim 1. However Synthesis Examples 4, 18 and 20 found in column 18, lines 10-34, column 25, lines 16-54, and column 26, lines 16-44, respectively disclose quinonediazide (NQD) compounds which meet the claimed NQD compounds recited in claims 12 and 29.

TOMIKAWA et al discloses the suitable use of several NQDs as long as the phenol compound condensed with the naphthoquinonediazidesulfonyl chloride has a dipole moment of 0.1 to 1.6. Here the skilled artisan is taught to use any of the phenol compound to make the photosensitive NQD compound with the stipulation of having the disclosed dipole moment.

It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist composition comprising an NQD to select anyone of Synthesis Examples 4 18 or 20 in place of Synthesis Example 1 and 2 in Examples 1 and 2 as a photosensitizer with the reasonable expectation of same or similar results with respect having low film loss in the unexposed regions.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. OKUDA et al and KATOU et al are cited of interest as references, which disclose the use of polyimide precursors that generally disclose the use of a trimellitic acid anhydride chloride, reacted with a diamine to form said polyimide precursor.

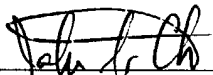
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

The fax phone number for the USPTO is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John S. Chu
Primary Examiner, Group 1700

J.Chu
June 28, 2004